

Application Note

Determination of benzoic acid

Industry	Pharmaceutical
Instrument	Automatic potentiometric titrator
Measurement method	Potentiometric titration / Neutralization titration
Standards	Japanese Pharmacopoeia (JP)

1. Scope

Benzoic acid is used in pharmaceuticals as a topical disinfectant and antifungal agent and standard methodology for its determination is specified in the Japanese Pharmacopoeia (JP). This Application Note introduces an example of the determination of benzoic acid by the JP.

2. Post-measurement procedure

Seal the refill port for internal liquid of the reference electrode with a rubber plug so that the internal liquid is prevented from leaking out or concentrating. Once done, store the electrode in accordance with the following:

- For short-term storage (less than one month) store immersed in pure water.
- For long-term storage (longer than one month) store immersed in a solution of pH 4 standard solution and 3.3 mol/L KCl solution mixed in an equal volume ratio.

3. Apparatus

Equipment	Automatic potentiometric titrator (preamplifier STD)
Electrode	Combined pH glass electrode (Internal solution 3.3 mol/L potassium chloride solution)

4. Reagents

Titrant	0.1 mol/L Sodium hydroxide solution
Solvents	Neutralizing ethanol*, Ion-exchanged water

*Add roughly 2~3 drops of phenolphthalein reagent to an appropriate amount of ethanol and add 0.01 mol/L sodium hydroxide solution until the color turns pale red. Reagents should be prepared just prior to the intended time of use.

5. Procedure

- 1) The sample is dried in a desiccator with silica gel as a desiccant for 3 hours.
- 2) Collect 50 mL of sample in a beaker and measure the mass.
- 3) Add 25mL of neutralized ethanol and 25mL of pure water to dissolve the sample.
- 4) Titrate with 0.1 mol/L Sodium hydroxide solution.

6. Calculation

$$\text{Purity of benzoic acid (\%)} = (\text{EP1} - \text{BL1}) \times \text{TF} \times \text{C1} \times \text{K1} / \text{S}$$

EP1	Titration volume (mL)	
BL1	Titration volume (mL) of blank test	= 0
TF	Factor of Titrant	= 0.9789
C1	Concentration conversion coefficient (mg/mL)	= 12.21
K1	Unit Conversion coefficient	= 0.1
S	Sample size (g)	

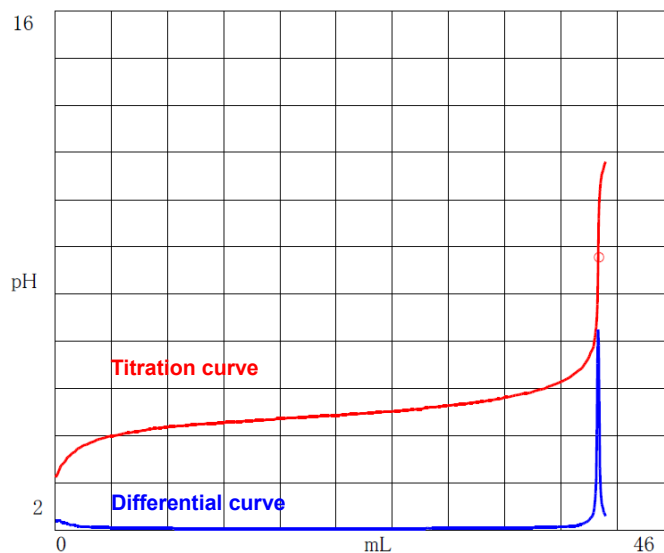
7. Example

—Titration parameters—

<u><Titr. Mode></u>	Auto Int.	<u><Ctrl. Para.></u>
<u><Titr. Form></u>	Level Stop	Number of EP 1
		End Sense Auto
<u><Titr. Para.></u>		Gain 1
Max Volume	60(mL)	Data Sampling Auto
Channel/Unit(Ctrl.)	Ch1, pH	Ctrl. Speed Auto
Wait Time	0 (s)	Other Control Standard
Dose Mode	None	Auto Int. Mode Standard
		Stirrer Speed 4

(Listed above are example settings. Availability of settings may vary by instrument model.)

— Titration curve —



— Measurement results —

Table. Measurement results

	Sample (g)	Titration amount (mL)	Purity (%)
1	0.5085	42.5088	99.92
2	0.5074	42.3084	99.67
3	0.5017	41.8609	99.73
Mean	-	-	99.77
SD	-	-	0.13
RSD(%)	-	-	0.13